

SOME BEES IN THE COLLECTION OF THE  
CALIFORNIA ACADEMY OF SCIENCES

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Looking over the undetermined bees at the Academy recently, I selected the following for study:

OXÆIDÆ

PROTOXÆA GLORIOSA (Fox)

Females: Baboquivari Mountains, Arizona, August 18, 1924 (O. C. Poling).

HYLÆIDÆ

HYLÆUS TRIDENTATUS (Cockerell)

Both sexes; Silver Cañon, White Mountains, Inyo County, California, May 11, 1926 (J. O. Martin).

HYLÆUS NUNENMACHERI (Bridwell)

Female; Mount St. Helena, California, May 12, 1926 (E. P. Van Duzee).

PANURGIDÆ

*Panurgus melanocephalus* Cockerell, n. sp.

Male (type). Length about 9 mm.; rather slender, black, including face; head very broad; hair of head long and abundant but erect, not concealing the surface, mostly black but white on lower part of cheeks and below mandibles; flagellum long and stout, dark red beneath except at base; clypeus dullish, rugulose, with a median longitudinal depression; labrum highly polished; mandibles rufous apically; front entirely dull; cheeks shining; thorax above dullish, mesothorax with a strong median groove; scutellum densely and very finely punctured; area of metathorax dull, not evidently sculptured; mesopleura dull; hair of thorax long and pale, brownish-tinted above; tegulæ shining black; wings faintly dusky, stigma and nervures sepia brown; first recurrent nervure meeting first intercubitus; legs black with pale hairs, tarsi somewhat rufescent apically; abdomen shining, thinly hairy, bases of segments more or less reddish; apex with a tuft of light hairs. Closely related to *P. atriceps* (Cresson). but considerably larger with very broad head, much duller, rugulose clypeus, and shorter mandibles. The dull mesothorax and black tegulæ are also distinctive.

Female. Differs from *P. atriceps* in a similar manner; the dull clypeus, long brownish black hairs on face, dull mesothorax, and darker though somewhat reddish tegulæ. The stigma is dull pale ferruginous, much lighter than in the males. The hair of the thorax above is dilute sooty.

Type No. 2386, Mus. Calif. Acad. Sci., collected by E. C. Van Dyke, April 22, 1919, at **Berkeley, California**. Two females are from Muir Woods, Marin County, California, May 4, 1913 (Van Dyke). *P. atriceps* occurs in the coast region from Seattle, Washington (Kincaid), to mountains near Claremont, California (Baker). Fowler records it from Berkeley.

#### COLLETIDÆ

##### *Colletes kobensis* Cockerell, n. sp.

Female. Length about 12 mm., anterior wing 8.3 mm.; rather robust, black with pale ferruginous hair on thorax above and occipital region with no dark hair intermixed; other hairs of head and thorax lighter, white on front of head, cheeks and lower parts of thorax; mandibles black; labrum highly polished, convex, with a median sulcus; malar space linear; clypeus dull, extremely densely and coarsely punctured; face broad; flagellum very obscurely reddish beneath, a little lighter red at tip; mesothorax with very coarse punctures, but on disc shining between the punctures; scutellum shining anteriorly; base of metathorax with a transverse keel, above which are numerous ridges; tegulæ translucent rufotestaceous; wings hyaline, very faintly dusky, stigma and nervures dusky reddish; second cubital cell very broad, receiving recurrent nervure in middle; legs ordinary, with pale hairs, reddish on inner side of tarsi; abdomen moderately shining, closely punctured on first segment, more finely on second, weakly on the others; segments 2 to 4 with rather broad dense white hair bands; first segment with a little band at each extreme side; fifth with a narrow band, its outline convex toward base of segment; apical segment with thin dark rusty-brown hairs. This bee had collected bright ferruginous pollen.

Type, female, No. 2387, Mus. Calif. Acad. Sci., collected October 16, 1909, at **Kobe, Japan**. It has the appearance of *C. succinctus* (L.), but is separated by the first abdominal segment shining and more coarsely punctured and not red on apical margin, the second segment not so finely punctured and the abdominal bands white instead of pale ochreous. Also the basal hair-band on second segment is lacking. Looked at from in front they might well be considered as identical.

The recorded Japanese species of *Colletes* are separated thus:

- Male: 10-11 mm. long; resembles *C. collaris* Dours (*C. cariniger* Pérez), having the sixth ventral segment strongly carinate; hair lively red on vertex, thorax above and first two abdominal segments.....*patellatus* Pérez
- Females (the males unknown)..... 1
1. Abdomen very shining, pyriform; first segment with hind margin ferruginous; wings yellowish.....*perforatus* Smith
- . Abdomen not thus shiny, densely punctured; malar space very short ..... 2
2. Aspect of *fodiens* (Kirby); abdomen with sculpture of first segment somewhat coarse, on second fine, and the rest very fine; hair of thorax above yellowish gray (Yokohama).....*seitzi* Alfken
- . Aspect of *C. succinctus* (L.), but really nearer *C. abeillei* Pérez; sculpture of abdomen extremely fine and dense, transverse, a little stronger and sparser on first segment; tegulæ pale; a small species 10 mm. long. (Tsushima).....*vogti* Pérez

*C. kobensis* cannot be any of these females though nearest to the smaller *C. vogti*, from which it differs in details of sculpture and color. *C. vogti* has the borders of the abdominal segments pallid, more broadly on the anterior ones. The pale tegulæ and other characters appear to negative the possibility that we have the female of *C. patellatus*. The abdominal bands are entirely different.

#### ANDRENIDÆ

##### NOMIA FROGGATTI Cockerell

Male. Length about 11.5 mm.; similar to the female, but differing thus: antennæ long (entirely black); face covered with pale fulvous hair; postscutellum with a pair of long slender spines (the sexual differences here as in the Philippine *N. quadrifasciata* Ashm.); abdomen with five color bands; anterior basitarsi short and broad, heavily clothed with long pale ochreous hair; hind trochanters with a strong obtuse projection; hind femora enormous, exceedingly broad, obtusely conical, about the middle with outstanding red hair; hind tibiæ very thick, trigonal, produced apically, clear red with a large black blotch on basal half; hind tarsi clear red.

Guadalcanar, Solomon Islands (C. H. Froggatt). Presented to the Academy by Dr. E. C. Van Dyke. The species was described in 1911 from two females collected by W. W. Froggatt in the Solomon Islands, the precise locality not specified.

The male is new. It differs at once from *N. pulchribalteata* Cam. by being larger, with bright reddish-orange abdominal bands and the hind femora more swollen.

#### ANTHOPHORIDÆ

##### CENTRIS ATRIPES Mocsary

Two miles east of Oracle, Arizona, July 24, 1924 (E. P. Van Duzee).

##### *Anthophora dulcifera* Cockerell, n. sp.

Female. Length about 15 mm.; robust, black, the head and thorax above with very bright ferruginous hair, slightly mixed with fuscous; abdomen with four emerald-green bands; face markings light cream color, consisting of transverse supraclypeal marks, produced above, an oblique band on each side bounding clypeus, lower margin of clypeus and a dagger-shaped median band, labrum, except latero-basal spots, and most of basal half of mandibles; flagellum very short, very dark reddish beneath; cheeks with white hair, becoming red above; underside of thorax with white hair; tegulæ dull ferruginous; wings brown; middle tibiæ with white hair, reddish apically on outer side, their basitarsi with black hair, but a tuft of white posteriorly at base; hind tibiæ with black hair in front, pure white behind except a black stripe from base rapidly narrowing to a point; hind basitarsi with entirely black hair, except that the apical brush is very dark chocolate; abdomen with first ventral segment broadly red apically.

Type, female, No. 2388, Mus. Calif. Acad. Sci., collected by J. C. Thompson in 1910 at **Keeling, China**. Superficially this looks like the Australian *A. cingulata* Fabr., the thoracic hair having exactly the same tint though the hair of the legs differs and the eyes are not green. It may possibly prove to be the female of *A. caldwelli* Ckll., from Foochow, China, but the face markings are not as yellow and the thoracic hair is much brighter. In Dover's key (Entomologist, 1924), it runs only to *A. cingulata*. It is, of course, one of the numerous forms segregated from *A. zonata* (L.).

##### ANTHOPHORA URENS Cockerell

Female. Ishigaki Island, Lu Chu Islands, 1910 (J. C. Thompson). This was described from Formosa. The present specimen differs only by having the outer side of middle basitarsi covered with red hair. The femora are very dark reddish.

*A. himalayensis* Rad. is allied, but much larger and differing in details of coloration.

***Anthophora tsushimensis* Cockerell, n. sp.**

Male. Length about 13 mm.; robust, black, including antennæ (except scape broadly creamy white in front); legs obscurely reddish; face-marks cream-color, consisting of supraclypeal marks (very broadly angulate above), region between clypeus and eyes, very broad band across lower margin of clypeus, and median stripe (on which clypeus is keeled), mandibles except apex and labrum except the usual basal spots; third antennal joint rather short, not nearly as long as next three together; malar space linear; labrum large; eyes green; hair of head pale yellowish above mixed with black (much black in front), cheeks with white hair; thorax above with light fulvous hair obscurely mixed with brown, beneath with white, tegulæ clear ferruginous; wings stained with brown, especially along the veins; legs with hair mostly pale, but entirely black on the broad (but not toothed) hind basitarsi; spurs of hind legs very large, the hind one exceptionally long and broad at base; middle tarsi long but quite simple and without ornaments, their basitarsi with pale grayish hair on outer side and black on inner; middle tibiæ with white hair on outer side but anteriorly with a tuft of red; hind tibiæ with hair anteriorly white, posteriorly dark brown; abdomen dull, the punctures excessively minute and weak, first two segments posteriorly obscurely reddish; sides of second segment and third more narrowly with appressed pale hair; segments 2 to 6 with white hair bands; apex with black hair and presenting two widely separated teeth.

Type, male, No. 2389, Mus. Calif. Acad. Sci., collected by J. C. Thompson, October 5, 1910, on **Tsu Shima Islands, Japan**. Resembles *A. confusa* Smith, from India, but there is no band on fifth abdominal segment and the abdominal bands are less distinct. The first abdominal segment shows signs of a narrow band laterally, and it was probably more complete when the insect was fresh. There is a superficial resemblance to *A. agama* Rod. which I have from Athens (Morice). This and other specimens reported in this paper had by error been labeled "Tsu Shima, Lu Chu Is.," but the Tsu Shima Islands are in the strait between Korea and Japan and are entirely separated from the Lu Chu or Riu Kiu chain.

***Anthophora (Micranthophora) curta* Prov. melanops**

Cockerell, n. var.

Male. Like *A. curta*, but eyes entirely very dark reddish brown instead of green. This is certainly not due to cyanide, the light

yellow markings of clypeus, labrum and mandibles remaining quite normal.

Type, male, No. 2390, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, July 24, 1924, two miles east of **Oracle, Arizona.**

**Melissodes metenua** Ckll. **ablusa** Cockerell, n. race

Female. Flagellum very bright ferruginous beneath except at base; hair of thorax variable, sometimes entirely black on mesothorax anteriorly; light hair band on fourth abdominal segment evanescent or feebly developed; hind basitarsi as well as tibiæ with creamy-white hairs.

Type, female, No. 2391, Mus. Calif. Acad. Sci., collected by E. C. Van Dyke, September 1, 1912, at **Milbrae, California.** Paratypes seven females, same data. A very striking little insect, but certainly only a slightly modified race of *M. metenua* from Oregon. In build and general appearance there is a resemblance to *Exomalopsis*, but the mouth parts are typical for *Melissodes*, with long paraglossæ and four-jointed maxillary palpi (the first joint large and very short, the next two long and equal, the last very small and slender, less than half the length of third). The bees have collected light orange pollen apparently from a species of compositæ.

MEGACHILIDÆ

MEGACHILE DOEDERLEINII Friese

Female. Tsu Shima, October 5, 1910 (J. C. Thompson).

MEGACHILE BICOLOR KAGIANA (Cockerell)

Male. Keelung, China, 1910 (J. C. Thompson). I described *kagiana* from males collected in Formosa and later called the female *M. bicolor taiwana*, not recognizing that it was the same species. Hedicke has recently (1925) referred both to *M. bicolor* (Fabr.), but true Indian *M. bicolor* (the male of which is *M. fletcheri* (Ckll.)) has much black hair on the mesopleura in both sexes, and is certainly subspecifically distinct. The Chinese male before me has the hair of face, thoracic dorsum and pleuræ all very bright red; it is more brightly colored than the original *M. kagiana*, but agrees structurally and cannot be separated.

In the same excellent paper Hedicke treats the Formosan

*M. takaoënsis* Ckll. as a synonym of *M. fervida* Sm. from Hongkong. However, in 1920 I showed that Smith's name was preoccupied, and proposed to substitute *M. perfervida* Ckll. I have seen Smith's type, and had the impression that it was distinct from *M. takaoënsis*, but in view of Hedicke's researches I now think they must be considered the same, at least until new light can be thrown upon the subject. On this basis *M. takaoënsis* will remain the valid name.

#### MEGACHILE HUMILIS Smith

Female. Tsu Shima, October 5, 1910 (J. C. Thompson). Described from Shanghai.

#### *Megachile remotissima* Cockerell, n. sp.

Female. Length about 16.5 mm., width of abdomen about 6.5 mm.; black, very robust, mandibles, antennæ and tarsi black, tegulæ clear ferruginous; wings dilute brownish throughout; stigma dark red, nervures dark fuscous; head about as wide as thorax, facial quadrangle longer than broad; mandibles quadridentate, with a broad, cutting edge; clypeus excessively densely, quite strongly punctured, with a straight shining lower edge and a smooth median line; supra-clypeal area punctured but shining, especially the lower part, in abrupt contrast with the clypeus; clypeus with thin dusky reddish hair, sides of face with dense creamy-white hair, front and occiput with fulvous; mesothorax excessively densely punctured, dull anteriorly, shining between the punctures posteriorly; scutellum convex, closely punctured; thorax above with fulvous hair, not mixed with black; on sides and beneath it is pallid, approaching white; legs with mainly pale ochreous hair, bright orange-ferruginous on inner side of tarsi; spurs pale reddish; hind basitarsi very broad and flat; abdomen short and broad, the base with pale ochreous hair, the rest with short black hair and creamy-white hair bands, only those on third, fourth, and fifth segments well developed, on third weak in middle; apical segment slightly concave in profile, with suberect black hair; ventral scopa creamy-white becoming fulvous distally, black on last two segments. The abdomen is wholly without metallic tints.

Type, female, No. 2392, Mus. Calif. Acad. Sci., collected by J. C. Thompson May, 1910, on Ishigaki Island, Yaeyama Group, Lu Chu Islands. Closely related to *M. remota* Smith from Shanghai, but differs by the absence of violet and green color on the abdomen, and the distinctly greater size, yet it may perhaps be only a race or subspecies of *M. remota*. Strand

described a *M. remota* var. *kagoshimæ* from Kagoshima in southern Japan; I cannot very clearly make out that it is distinct from *M. remota*, and it is not the present form. Ishigaki is at the southern end of the Lu Chu chain, east of Formosa.

#### HOPLITINA HESPERIA Crawford

Crawford described this (1916) from a female 6.5 mm. long, collected at Redlands, California. A male from Silver Cañon, White Mountains, Inyo County, California, May 11, 1926 (J. O. Martin), has the venation of *H. hesperia* and can only be referred here. It is nearly 6 mm. long; eyes pea-green; face densely covered with pure white hair; flagellum obscurely reddish beneath; wings only slightly brownish; recurrent nervures about equally distant from ends of second cubital cell; first three abdominal segments clear red with a large black median patch; apex of abdomen red, broadly truncate, with a sharp tooth at each corner.

#### PAREVASPIS BASALIS Ritsema

Kobe, Japan, December, 1911.

#### XYLOCOPIDÆ

##### *Xylocopa fallax* Maidl. *thompsoni* Cockerell, n. race

Male. Length about 25 mm.; anterior wing, 21 mm. (26 mm. in *fallax*); antennæ black; clypeus, except lower margin, semicircular supraclypeal area, lateral face marks, extending up to level of anterior edge of lateral ocelli and then truncate, and semilunar marks enclosing middle ocellus, all cream-color; wings colored nearly as in *X. fallax mcgregori* Ckll., but not brilliant; hair of thorax black with an ochreous band along posterior edge of scutellum, a little on front of tegulæ, and a large reddish ochreous patch on pleura; no light hair on anterior edge of mesonotum; first abdominal segment with ochreous hair at each side; abdomen black, without any metallic color, the hind margins of segments concolorous; legs with black hair; hind femora broad, with a tooth at base.

Type, male, No. 2393, Mus. Calif. Acad. Sci., collected by J. C. Thompson, May, 1907, ten miles east of **Olongopa, Philippine Islands**, 1200 feet altitude. Possibly not more than an individual variation, but apparently a distinct race allied to *mcgregori*, readily separated by the almost entirely pale clypeus, large patch of light hair on pleuræ and the darker hair



of mesonotum anteriorly. Along the anterior edge of mesonotum the hair is pure black, but between this and the bare space is a broad band of obscure reddish hair, which in general view does not affect the prevailing dark appearance. I have one specimen of *mcgregori*, collected at Manila, which has only the broad lower margin of the clypeus black. It differs from the Olongopa bee by the more densely and finely punctured middle of the abdominal segments and the longer (23 mm.) anterior wings, with the basal half beautifully green, though with a purple streak. But another *mcgregori*, also from Manila, has the lower half of the clypeus black and the abdomen punctured as in *thompsoni*. The holotype (female) *mcgregori* belongs with the more closely punctured male, if there is any difference to be recognized in nomenclature. Maidl refers to the denser abdominal punctuation as a good character to separate *X. fallax* from *X. auripennis* Lep., which occurs in Borneo and elsewhere. The wings of *auripennis* are very much more brilliantly colored than those of *thompsoni*.

Evidently the *fallax* group in the Philippine Islands is subject to a good deal of variation, no doubt partly racial and partly individual. To properly elucidate it we should have many specimens from different localities.

#### NOMADIDÆ

##### *Nomada koreana* Cockerell, n. sp.

Female. Length about 7 mm.; anterior wing, 6.2 mm.; ferruginous red with lemon-yellow markings on the abdomen, but not elsewhere; head broad, facial quadrangle about square; eyes red; labrum and the simple mandibles red; antennæ clear red above and below, remarkably long, third joint long but conspicuously shorter than fourth and about as long as fifth; a large black area on upper part of face and extending to front, enclosing a red supraclypeal area; ocelli on a black patch not united with frontal patch; posterior orbits broadly red, but cheeks otherwise black; head and thorax with hardly any hair (perhaps partly denuded); mesothorax dull dusky red, densely punctured, with three black stripes; scutellum clear red, moderately elevated, not distinctly bigibbous; tubercles bright red, but the region in front of them black; a very broad black band from wings to base of middle legs; a black band down middle of metathorax; area of metathorax dull and granular; tegulæ bright ferruginous, punctured; wings brownish, stigma dull ferruginous, nervures fuscous; basal nervure going some distance basad of nervulus; legs clear red, the

femora suffusely blackened at base; spurs yellowish white; anterior coxæ unarmed; abdomen broad, moderately shining; first segment black at base and without yellow; second with a pair of very large pyriform yellow marks, the points directed mesad; marginal region of first three segments somewhat dusky; third segment with a pair of small yellow spots at each side; fourth with a pair of rather large transverse marks, the distance between them much less than the length of one; fifth with a very large quadrate yellow patch, about twice as broad as long; apical lunule or band of hair narrow; venter with small yellow markings.

Type, female, No. 2394, Mus. Calif. Acad. Sci., collected by J. C. Thompson, March 20, 1911, on **Musan Pass, Northern Korea**. This is the first *Nomada* from Korea, but nine species or races are known from Japan, eight from Formosa, one from China, one from Mongolia, and eight from Siberia. The present insect seems nearest to the Japanese *N. ruficornis koebeleri* Ckll., var. *a*, and may not be specifically distinct, though var. *a* is probably to be separated from *koebeleri*. In Schmiedeknecht's table of European species *N. koreana* runs to *N. jacobaeæ* var. *haematodes* Schm., but that has the first segment marked with yellow and the basal nervure meeting the nervulus. Ignoring the lack of hair, it runs to *N. braunsiana* Schm., but is apparently not closely allied. From eastern Siberia another member of this alliance was described as *N. amurensis* Rad., but Friese states that this is really *N. ruficornis* (L.). In the table of British species by Perkins, our insect runs nearest to *N. flava* Panzer, being distinctly related to this rather than to *ruficornis*. Compared with European *N. ruficornis* it has indeed a very different appearance.

#### MELECTIDÆ

##### *Epeolus tsushimensis* Cockerell, n. sp.

Male. Length about 9 mm.; anterior wing, 7 mm.; black without any red markings, but the fourth dorsal tergite, when greatly extended, shows a pale ferruginous base and the fourth sternite and those beyond are reddish clay-color, with appressed yellowish hair, the three curled ventral fringes being also of the same color; face narrowing below, densely covered with silver-white hair; mandibles darker red apically; labrum densely punctured, with a pair of very minute apical denticles, close together; cheeks with thin white hair; antennæ entirely black; a shining space on each side of vertex, but occipital region dull and rugose; mesothorax and scutellum dull, very densely rugosopunctate; the scutellum very coarsely sculptured, ob-

tusely bilobed, the axillæ pointed; upper border of prothorax with cream-colored hair, but no light hair on mesothorax; tubercles margined with white hair; white hair on postscutellum and large tufts behind wings; pleuræ entirely dull and rough; metathorax below the enclosure polished and shining; tegulæ black with the posterior margin dark red; wings dusky, especially apically; nervures and stigma black; basal nervure going very far basad of the nervulus; first recurrent joining second cubital cell before middle; legs with short white hair, a stripe of reddish golden on middle tibiæ; tarsi reddish apically; first two abdominal segments shining and well punctured; following segments duller and more closely punctured; first three segments with felt-like white (slightly creamy) hair bands, broad at sides and narrowing to a point mesad, where the first is very broadly interrupted, the others successively less so; no sign of an anterior band or process of the hairy area; fourth segment basally densely tomentose at sides, and fourth, fifth, and sixth with entire apical white bands; apical plate large, black, broadly rounded.

Type, male, No. 2395, Mus. Calif. Acad. Sci., collected by J. C. Thompson, October 5, 1910, on **Tsu Shima Islands**, between Korea and Japan. A very distinct species known by the simple interrupted bands on the basal abdominal segments. *E. ventralis* Meade-Waldo from near Tientsin, China (F. M. Thompson) is larger with the interrupted band on first tergite bilobed, and markings on mesonotum. The genus seems to be poorly represented in eastern Asia with one species in China, and thence the nearest localities are Assam (1), India (2), Tibet (1), Siberia (2, one of these also at Quetta), and Turkestan (2).

#### CROCISA JAPONICA Friese

Tsushima, October 5, 1910 (J. C. Thompson). Meyer cites it from the same locality, but also from Sikkhim in the Berlin Museum. The last locality is, I believe, wholly incorrect. I have seen various bees from the Berlin Museum labeled "Sikkhim" which certainly never came from that region. They came in every case, I believe, from the Bingham collection.

#### CROCISA GEMMATA Cockerell

Guadalcanar, Solomon Islands, four, December, 1920 (J. A. Kutsche), one collected by C. H. Froggatt and donated by Dr. E. C. Van Dyke. Previously known from the Solomon Islands, the precise island not specified.